

**Exhibit 5 to the Request for *Ex Parte* Re-examination of**

**In re Patent No: 6,222,525**

**Issued: April 24, 2001**

**Applicant: Brad A. Armstrong**

**Title: Image Controllers With Sheet Connected Sensors**



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56978  
Klarquist Sparkman, LLP  
JP 5-87760\_English.doc: Japanese-English patent translation

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November 17, 2006

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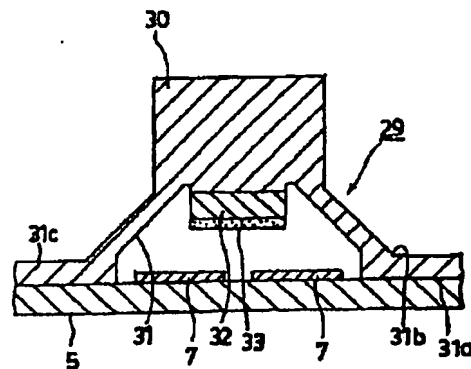
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(54) [Title of the Device] Pressure-sensitive switch

(57) [Abstract]

[Objective] To enable an operator to freely control, for example, the operation of a character of a video game, when performing a switching operation.

[Constitution] Comprises a rubber contact 29 on which a moving contact 32 is disposed on the undersurface of a moving part 30, wherein a conductive part 33 whose resistance is changed by pressing force is attached to the undersurface of said moving contact 32.



[Scope of Utility Model Registration Claims]

[Claim 1] A pressure sensitive switch comprising a rubber contact in which a moving contact is formed on the undersurface of a moving part, wherein a conductive part whose resistance changes with pressing force is attached to the undersurface of said moving contact.

[Brief Explanation of the Drawings]

[Fig. 1] Fig. 1 is a perspective view illustrating a controller for use in a video game, which embodies the present device.

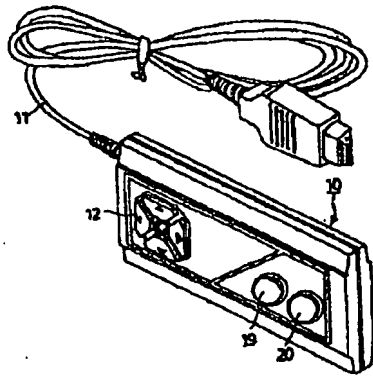
[Fig. 2] Fig. 2 is a longitudinal sectional front view of an essential element of the present device.

[Fig. 3] Fig. 3 is a longitudinal sectional front view of a conventional type.

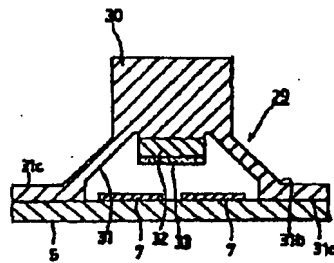
[Explanation of Symbols]

- 5 Substrate
- 7 Fixed contact
- 29 Rubber contact
- 30 Moving part
- 31 Elastic leg part
- 32 Moving contact
- 33 Conductive part whose resistance changes with pressing force

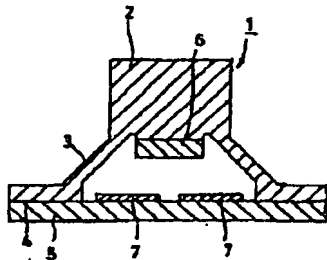
[Fig. 1]



[Fig. 2]



[Fig. 3]



[Detailed Explanation of the Device]

[0001]

[Industrial Field of Application]

The present device relates to a pressure sensitive switch and, more particularly, to a pressure sensitive switch in which electrical resistance can be changed by altering the pressing force on the moving part of a rubber contact.

[0002]

[Prior Art]

A conventional rubber contact of this type is discussed below with reference to Fig. 3. Fig. 3 is a sectional view of the said rubber contact. In Fig. 3, an elastic leg part 3 slopes obliquely downward from the peripheral portion of a moving part 2 of a rubber contact 1, and a horizontal portion 4 that extends horizontally from the bottom of the elastic leg part 3 is placed on a substrate 5. At the bottom of moving part 2, a moving contact 6, such as conductive rubber, is formed. When moving part 2 is not depressed, the undersurface of moving contact 6 is positioned above the bottom of the above-described elastic leg part 3. By pressing the top surface of moving part 2 downward, moving part 6 is lowered while being resisted by the elastic bias of elastic leg part 3 so as to connect to the fixed contacts 7 and 7 of a wiring pattern disposed on substrate 5.

[0003]

In addition, by removing the above-described depression of the said moving part 2, moving part 2 is lifted by the elastic restoring force of elastic leg part 3 so as to disconnect the above-described contacts.

[0004]

[Problems the Device is to Solve]

When the above-described conventional rubber contact 1 presses on moving part 2, moving contact 6, which is a conductive part disposed on the undersurface of moving part 2, connects to the fixed contacts 7 and 7 of the wiring pattern disposed on substrate 5. Then, by discontinuing the said pressing operation, the above-described electrical connection is released. Thus, rubber contact 1 merely effects an electrical on/off operation, and does not enable the operator to freely control, for example, the operation of a character in a video game.

[0005]

Accordingly, there is a technical problem to be solved, so that the operator is able to freely control, for example, the operation of a character in a video game by operating the switch, and it is an objective of the present device to solve the above-described problem.

[0006]

[Means of Achieving the Objective]

The present device has been proposed in order to achieve the above objective, and provides a pressure sensitive switch comprising a rubber contact in which a moving contact is formed on the undersurface of a moving part, wherein a conductive part whose resistance changes with pressing force is attached to the undersurface of the moving contact.

[0007]

[Operation of the Device]

Inasmuch as the present device places a conductive part whose electrical resistance changes with pressing force onto the undersurface of a moving contact, which is also a conductive part that is formed on the undersurface of the moving part, when the switch of the present device is used, for example, as the controller of a video game, the electrical resistance of the conductive part affixed to the undersurface of the moving contact changes according to the degree of the pressing force when the operator presses the moving part of the switch, thereby changing the signal from the controller, and allowing the operator to freely control the operation of the character in the video game.

[0008]

[Embodiments]

An embodiment of the present device is described in detail below according to Figs. 1 and 2. While describing the present device, the construction of the related art is simultaneously discussed, and the subject components are designated with the same symbols. Fig. 1 illustrates a controller 10, which is connected to a video game machine (not shown) via a cable 11. A cross shaped key 12 positioned at the upper left part of controller 10 is used for vertically and horizontally moving characters on the screen. Numerals 19 and 20 shown at the right portion indicate trigger keys.

[0009]

Fig. 2 is a longitudinal sectional front view of rubber contact point 29 on the cross shaped key 12 provided for

controller 10. Although in this embodiment the rubber contact of cross shaped key 12 is discussed, it is not limited to this. As discussed in the description of the prior art, the said rubber contact point 29 is formed from an elastic rubber material, and a moving part 30 is disposed onto the center of each part of the cross shaped key 12. An elastic leg part 31 slopes obliquely downward from the peripheral center portion of each moving part 30, and undersurface 31a of the said elastic leg part 31 is placed on the top surface of substrate 5. Moving contact 32, which is formed of conductive rubber disposed on the bottom end of each of the above-described moving part 30, and conductive part 33, whose resistance varies with pressure, is attached by printing or integral molding to the bottom end surface of the moving contact 32. When pressing force is not applied to said moving part 30 (when the pressing operation is not performed), conductive part 33 is positioned above the bottom end surface 31a of the above-described elastic leg part 31. By performing the depressing operation, moving part 30 is lowered while being resisted by the elastic bias of elastic leg part 31 so that it is electrically connected to fixed contacts 7 and 7 on a wiring pattern disposed on substrate 5. By discontinuing the above-described pressing operation, said moving part 30 is lifted by the elastic restoring force of elastic leg part 31, thereby releasing the above-described electrical connection.

[0010]

Each moving part 30 of said rubber contact point 29 is provided at the bottom of the pressing part (indicated by  $\Delta$ ) provided for each forward end of the cross key 12. By depressing the respective pressing parts of cross shaped key 12 with a fingertip, the character of the video game is moved in the direction corresponding to the pressed part, and the speed of the character's movement changes according to the magnitude of the pressing force applied by a fingertip. More specifically, the pressing force applied by the fingertip on each pressing part of the cross shaped key 12 changes the electrical resistance through conductive part 33, whose resistance changes according to the pressing force, fixed on the undersurface of the moving part 30 of rubber contact point 29. Thus, the operation of the character in a video game can be freely controlled by the pressing force applied by the fingertip of the operator.

[0011]

Moreover, the foregoing embodiment described an instance in which present device is used in the controller 10 of a video game, but in addition to that, using the switch of the present device in the resistor of a multi-vibrator makes it possible to change the frequency with the pressing force of the switch. It should be noted that various modifications may be made to the present device within the spirit of the device, and it is natural that the present device encompasses such modifications.

[0012]

**[Effects of the Device]**

As we have described in detail in the above-described embodiment, this device offers the following enormous advantages. In performing the switching operation by pressing the moving part of the switch, the electrical resistance of the switch is varied by changing the pressing force. This makes it possible to freely control, for example, the operation of a character in a video game with the pressing force on the switch, and thus, the operator's intentions can be directly reflected in the operation of said character. Hence, according to the present device, the entertaining characteristics of the video game, for example, can be considerably increased.



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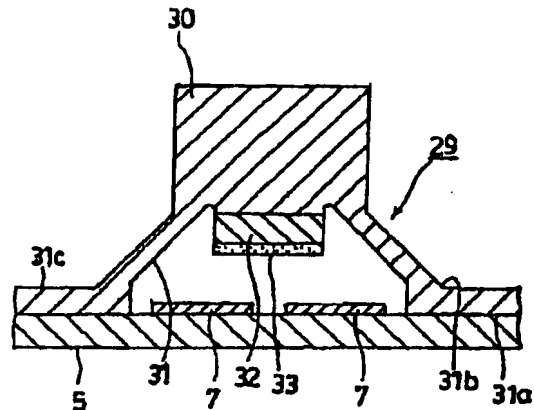
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(54)【考案の名称】 感圧スイッチ

(57)【要約】

【目的】 スイッチ操作時に於て、操作者の意思によつて、例えばビデオゲームのキャラクターの動作を自由にコントロールできるようにする。

【構成】 可動部30の下面に可動接点32が設けられているラバー接点29であつて、該可動接点32の下面に押し圧によつて抵抗値が変化する導電部33を装着する。



【実用新案登録請求の範囲】

【請求項 1】 可動部の下面に可動接点が形成されたラバー接点に於て、該可動接点の下面に押し圧により抵抗値が変化する導電部を装着して成る感圧スイッチ。

【図面の簡単な説明】

【図 1】 本考案を実施したビデオゲーム用のコントローラの平面図。

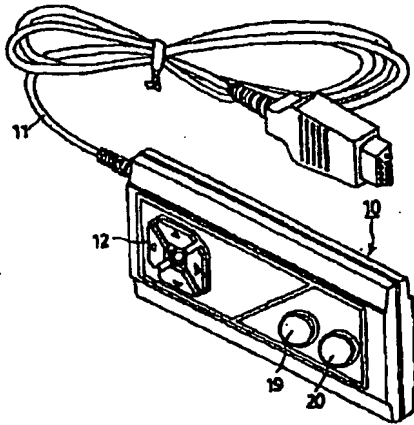
【図 2】 本考案の要部の縦断正面図。

【図 3】 従来型の縦断正面図。

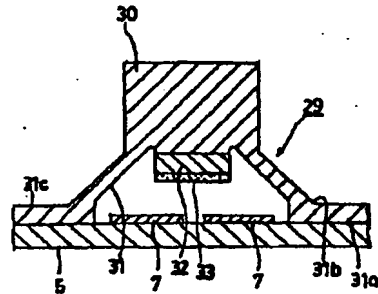
【符号の説明】

- 5 基板
- 7 固定接点
- 29 ラバー接点
- 30 可動部
- 31 弾性脚部
- 32 可動接点
- 33 押し圧によって抵抗値が変化する導電部

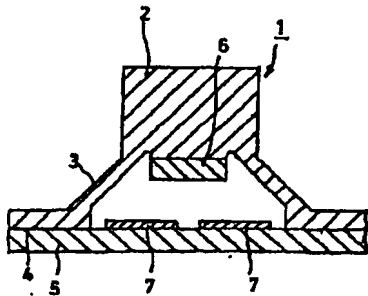
【図 1】



【図 2】



【図 3】



## 【考案の詳細な説明】

【0001】

## 【産業上の利用分野】

本考案は、感圧スイッチに関するものであり、特に、ラバー接点の可動部の押し圧力を変化させることによって電気的抵抗値を変化できるようにした感圧スイッチに関するものである。

【0002】

## 【従来の技術】

従来の此種ラバー接点を図3に従って説明する。図3は該ラバー接点の断面図である。図に於てラバー接点1の可動部2の外周から弾性脚部3が斜め下方へ斜設され、そして、該弾性脚部3の下端部から水平方向へ延設されて水平部4とし、該水平部4を基板5上に載置せしめる。又、該可動部2の下端部には導電性ゴム等にて可動接点6が夫々形成されており、且つ、該可動接点6の下端部は、可動部2を打鍵しないときには前記弾性脚部3の下端部より上方へ位置し、該可動部2の上面を下圧することにより、弾性脚部3の弾性的付勢に抗し、前記可動接点6が下降して基板5に配設されている配線パターンの固定接点7、7にオンすることになる。

【0003】

更に、該可動部2の前記打鍵を解除すれば、可動部2は弾性脚部3の弾性復元力により上動し、前記接点相互のオン状態が解除されることになる。

【0004】

## 【考案が解決しようとする課題】

上記従来型のラバー接点1は可動部2を打鍵すれば、該可動部2の下面に設けられている導電部である可動接点6が基板5に配設されている配線パターンの固定接点7、7にオンする。そして、該打鍵操作を解除することにより前記相互の電気的結合が解除される。従って、該ラバー接点1は単に電気的オン・オフの操作を為すだけであって、例えば、ビデオゲーム等のキャラクターの動作を操作者の意志で自由にコントロールすることはできない。

【0005】

そこで、スイッチ操作時に於て、操作者の意思により、例えばビデオゲームのキャラクターの動作を自由にコントロールできるようにするために解決せらるべき技術的課題が生じてくるのであり、本考案は該課題を解決することを目的とする。

【0006】

【課題を解決するための手段】

本考案は上記目的を達成するために提案せられたものであり、可動部の下面に可動接点が形成されたラバー接点に於て、該可動接点の下面に押し圧により抵抗値が変化する導電部を装着して成る感圧スイッチを提供するものである。

【0007】

【作用】

本考案は可動部の下面に形成されている導電部である可動接点の下面に更に押し圧によって電気的抵抗値が変化する導電部を装着しているもので、例えば、本考案のスイッチをビデオゲームのコントローラ用として用いているときには、操作者が本考案のスイッチの可動部を押圧する際、その押圧力の程度によって可動接点の下面に装着している前記導電部の電気的抵抗値が変化し、依って、該抵抗変化値がコントローラ信号の変化をうながす。斯くして、前記ビデオゲームのキャラクターの動作が操作者の意思により自由にコントロールされる。

【0008】

【実施例】

以下、本考案の一実施例を図1及び図2に従って詳述する。尚、説明の都合上、従来公知に属する構成も同時に説明し、対象部分は同一符号を用いるものとする。図1はコントローラ10を示し、ケーブル11を介してビデオゲーム機（図示せず）に接続される。コントローラ10の上面左の十字キー12は、画面上のキャラクターを上下左右に移動させるものである。右側の19、20はトリガーキーである。

【0009】

図2は前記コントローラ10に設けられている十字キー12のラバー接点29の縦断正面図である。尚、この実施例では十字キー12のラバー接点について説

明しているが之に限定せらるべきではない。該ラバー接点29は従来例にて説明したように弾性ゴム材より成り、前記十字キー12の夫々の中心部に可動部30が設けられ、各可動部30は夫々の外周中間部より弾性脚部31が斜め下方に斜設され、該弾性脚部31の下端面31aが基板5の上面に載置される。又、前記各可動部30の下端部には導電性ゴムにて夫々可動接点32が配設され、且つ、該可動接点32の下端面には、押し圧によって抵抗値が変化する導電部33が夫々印刷又は一体成形にて装着されている。そして該可動部30を押圧（打鍵操作）しない状態では、前記弾性脚部31の下端面31aより上方へ位置し、打鍵操作によって該可動部30は弾性脚部31の弾性付勢力に抗して下降し、基板5に設けた配線パターンの各固定接点7、7に電気的結合が為されるようになっている。そして、前記押圧動作を解除することにより、該可動部30が弾性脚部31の弾性復元力にて上動し、前記電気的結合が解除される。

## 【0010】

而して、該ラバー接点29の夫々の可動部30は夫々前記十字キー12の各先端部に設けた押圧部（各△印）の下部に対応して設けられており、該十字キー12の押圧部を指頭にて押圧することにより、該押圧部の方向にビデオゲームのキャラクターが移動し、而も、該指頭による押圧力の大小によって該キャラクターの移動速度が変化する。即ち、前記十字キー12の各押圧部に対する指頭による押圧力はラバー接点29の可動部30の下面に装着されている押し圧によって抵抗値が変化する導電部33によって電気抵抗が変化する。斯くして、ビデオゲームのキャラクターの動作が前記操作者の指頭による押圧力によって任意にコントロールすることができる。

## 【0011】

而して、上記一実施例はビデオゲームのコントローラ10に実施した場合を説明したが、その他、マルチバイブレーターの抵抗部に本考案のスイッチを用いることにより、周波数をスイッチの押し圧によって変化させることもできる。尚、この考案は、この考案の精神を逸脱しない限り種々の改変を為すことができ、そして、この考案が該改変されたものに及ぶことは当然である。

## 【0012】

## 【考案の効果】

この考案は、上記一実施例に詳述せる如く、スイッチの可動部を押圧してスイッチング動作を為すとき、該押圧力を変化させることによってスイッチの電気的抵抗値が変化し、依って、例えばビデオゲームのキャラクターの動作をスイッチの押圧力によって自由にコントロールすることができることになり、操作者の意思が直接に該キャラクターの動作に表現される。斯くして、該ビデオゲーム等に対する興味を一層助成する等、正に著大なる効果を奏する考案である。

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(54) [Title of the Invention] PRESSURE-SENSING SWITCH

(57) [Abstract]

[Object] To enable an operator to freely control, for example, the operation of a character of a video game, when performing a switching operation.

[Construction] In a rubber contact 29 in which a moving contact 32 is disposed on the bottom surface of a moving part 30, a conductive portion 33 whose resistance varies with a pressing force is attached to the bottom surface of the moving contact 32.

[Claim]

[Claim 1] A pressure-sensing switch comprising a rubber contact in which a moving contact is formed at a bottom surface of a moving part, wherein a conductive portion whose resistance changes with a pressing force is attached to a bottom surface of said moving contact.

[Brief Description of the Drawings]

[Fig. 1] Fig. 1 is a perspective view illustrating a controller for use in a video game, which embodies the present invention.

[Fig. 2] Fig. 2 is a longitudinal sectional front view illustrating the essential portion of the present invention.

[Fig. 3] Fig. 3 is a longitudinal sectional front view illustrating a conventional type.

[Reference Numerals]

- 5 substrate
- 7 fixed contact
- 29 rubber contact
- 30 moving part
- 31 elastic leg portion
- 32 moving contact
- 33 conductive portion whose resistance varies with a pressing force



[Detailed Description of the Invention]

[0001]

[Industrial Field of the Invention]

The present invention relates to a pressure-sensing switch and, more particularly, to a pressure-sensing switch in which electrical resistance is made variable by changing the pressure on a moving part of a rubber contact.

[0002]

[Description of the Related Art]

A conventional rubber contact of this type is discussed below with reference to Fig. 3. Fig. 3 is a sectional view illustrating the rubber contact. In Fig. 3, an elastic leg portion 3 obliquely slopes downward from the peripheral portion of a moving part 2 of a rubber contact 1, and a horizontal portion 4 which horizontally extends from the bottom of the elastic leg portion 3 is placed on a substrate 5. At the bottom of the moving part 2, a moving contact 6, such as conductive rubber, is formed. When the moving part 2 is not pressed, the bottom surface of the moving contact 6 is positioned above the bottom of the elastic leg portion 3. By pressing the top surface of the moving part 2 downward, the moving part 6 is lowered while being resisted by an elastic urging force of the elastic leg portion 3 so as to connect fixed contacts 7, 7 of a wiring pattern disposed on the substrate 5.

[0003]

By stopping the releasing operation on the moving part 2, the moving part 2 is lifted by an elastic restoring force of the elastic leg portion 3 so as to disconnect the above-described contacts.

[0004]

[Problems to be Solved by the Invention]

According to the aforementioned conventional rubber contact 1, by pressing the moving part 2, the moving contact 6, which is a conductive portion, disposed on the bottom surface of the moving part 2 connects the fixed contacts 7, 7 of the wiring pattern disposed on the substrate 5. Then, by discontinuing the pressing operation, the above-described electrical connection is released. Thus, the rubber contact 1 merely effects an electrical on/off operation, and does not enable the operator to freely control, for example, the operation of a character in a video game.

[0005]

Accordingly, there is a technical problem to be solved, so that the operator is able to freely control, for example, the operation of a character in a video game by operating the switch. It is an object of the present invention to solve the above-described problem.

[0006]

[Means for Solving the Problems]

In order to achieve the above object, according to the present invention, there is provided a pressure-sensing switch comprising a rubber contact in which a moving contact is formed at a bottom surface of a moving part, wherein a conductive portion whose resistance changes with a pressing force is attached to a bottom surface of the moving contact.

[0007]

[Operation]

In the present invention, a conductive portion whose electrical resistance changes with a pressing force is fixed on the bottom surface of the moving contact, which is also a conductive portion, formed on the bottom surface of the moving part. Accordingly, when using the switch of the present invention as, for example, a controller of a video game, when the operator presses the moving part of the switch, the electrical resistance of the conductive portion fixed on the bottom surface of the moving contact changes according to the degree of the pressing force, thereby changing a signal from the controller. This enables the operator to freely control the operation of the character of the video game.

[0008]

[Embodiment]

An embodiment of the present invention is described in detail below with reference to Figs. 1 and 2. While

describing the present invention, the construction of the related art is simultaneously discussed, and counterpart components are designated with like reference numerals. Fig. 1 illustrates a controller 10, which is connected to a video game machine (not shown) via a cable 11. A cross key 12 positioned at the upper left portion of the controller 10 is used for vertically and horizontally moving characters on the screen. Reference numerals 19 and 20 shown at the right portion indicate trigger keys.

[0009]

Fig. 2 is a longitudinal sectional front view illustrating a rubber contact 29 of the cross key 12 provided for the controller 10. Although in this embodiment the rubber contact of the cross key 12 is discussed, the present invention is not restricted to this. As discussed in the description of the related art, the rubber contact 29 is formed of an elastic rubber material, and a moving part 30 is disposed at the central portion of each section of the cross key 12. An elastic leg portion 31 slopes obliquely downward from the peripheral middle portion of each moving part 30, and a bottom surface 31a of the elastic leg portion 31 is placed on the top surface of the substrate 5. A moving contact 32, which is formed of conductive rubber, is disposed at the bottom end of each moving part 30, and a conductive portion 33 whose resistance varies with pressure

is attached to the bottom end surface of the moving contact 32 by printing or integral molding. When the moving part 30 is not pressed (when the pressing operation is not performed), the conductive portion 33 is positioned above the bottom end surface 31a of the elastic leg portion 31. By performing the pressing operation, the moving part 30 is lowered while being resisted by an elastic urging force of the elastic leg portion 31 so that it is electrically connected to the fixed contacts 7, 7 of a wiring pattern disposed on the substrate 5. By discontinuing the pressing operation, the moving part 30 is lifted by an elastic restoring force of the elastic leg portion 31, thereby releasing the above-described electrical connection.

[0010]

The moving part 30 of the rubber contact 29 is provided at the bottom of the pressing portion (indicated by  $\Delta$ ) provided for each forward end of the cross key 12. By pressing the pressing portion of the cross key 12 with a fingertip, the character of the video game is moved in the direction corresponding to the pressed portion, and the speed of the character's movement changes according to the magnitude of the pressing force applied by a fingertip. That is, the pressing force applied by the fingertip on each pressing portion of the cross key 12 changes the electrical resistance through the conductive portion 33, whose

resistance changes according to the pressing force, fixed on the bottom surface of the moving part 30 of the rubber contact 29. Thus, the operation of the character of the video game can be freely controlled by the pressing force applied by the fingertip of the operator.

[0011]

In the foregoing embodiment, the present invention is used in the controller 10 of a video game. However, the switch of the present invention may be used for a resistor of a multi-vibrator so as to change the frequency by the pressing force on the switch. It should be noted that various modifications may be made to the present invention within the spirit of the invention, and the present invention encompasses such modifications.

[0012]

[Advantages]

As is seen from the detailed description of the above-described embodiment, the present invention offers the following enormous advantages. In performing the switching operation by pressing the moving part of the switch, the electrical resistance of the switch varies by changing the pressing force. This makes it possible to freely control, for example, the operation of a character of a video game, by the pressing force on the switch, and thus, the operator's intention can be directly reflected on the

operation of the character. Hence, according to the present invention, the entertaining characteristics of, for example, the video game can be considerably increased.